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ABSTRACT

Expectation research has frequently assumed that teachers respond differently to students, based upon their perceptions of student ability. Because general student behavior is correlated with ability, however, it is possible that teachers are responding to differences in behavior rather than ability. A study examined the relationship between teacher behavior to teacher perceptions of student ability, and the relationship of teacher behavior to teacher perceptions of student behavior. Data were obtained on teacher-student interactions in 105 seventh- and eighth-grade mathematics and English classes. Results indicated that both perceptions of ability and general student behavior affected teacher behavior. This suggests that both student characteristics should be considered when attempting to understand differences in teacher behavior. The study also demonstrates the importance of considering the context in which teacher-student interactions occur, since results in this study for English instruction were not the same as the results for mathematics classes. (Author/JD)

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Differences in Teacher-Student Interactions for Students Differing in Ability and Behavior

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Abstract

Expectation research has frequently assumed that teachers respond differently to students based upon their perceptions of student ability. Because general student behavior is correlated with ability, however, it is possible that teachers are responding to differences in behavior rather than ability. This study examines the relative impact of teacher perceptions of student behavior and ability on teacher behavior through the use of partial correlations. Data were obtained on teacher-student interactions in 105 seventh- and eighth-grade math and English classes. Results indicated that both perceptions of ability and general student behavior affected teacher behavior suggesting that both student characteristics should be considered when attempting to understand differences in teacher behavior. This study also demonstrates the importance of considering the context in which teacher-student interactions occur as results for English were not the same as results for math classes.

Differences in Teacher-student Interactions for Students Differing in Ability and Behavior

Classroom observation has frequently revealed patterns of differential teacher behavior toward students the teacher perceives as low and high in ability (Good, 1980). This different treatment is generally assumed to be the result of teacher expectations for student achievement. Brophy and Good (1974) have shown that such treatment may tend to broaden the performance gap between these two groups of students because teachers may tend to provide fewer and less intensive learning opportunities for low expectation students than for high expectation students.

Cooper (1979) in his review of expectation research presented a causal model explaining why teachers sometimes respond differently to high and low ability students and the implications this differential treatment has for student achievement. Cooper suggests that teachers may perceive their own control as a more important determinant of success for lower ability students. Thus, teachers may not encourage lower ability students to participate in whole class public interactions, and, instead, may seek out these lower ability students in private settings where the teacher has greater control over the interaction, and, hence, the student has a greater chance to succeed. This attempt to discourage student initiations may result in negative climate and feedback patterns with respect to whole class activities for students perceived as lower ability.

As indicated above, in most expectation research the assumption has been that the teacher reacts differently to students based on the perceived ability level of the student. However, ability is correlated

with student behavior, i.e., high ability students are often more cooperative and enthusiastic than low ability students. This suggests that the teacher's different treatment of high and low ability students may be partially a result of behavior differences between these two groups of students. If, as Doyle (1979) has pointed out, one of the main tasks of teaching is to obtain student cooperation, teachers may find it necessary to treat behavior problem students differently from other students in order to maintain these students' cooperation and minimize disruption of classroom activities.

The purpose of this paper is to investigate the relationship of teacher behavior to teacher perceptions of student ability and student behavior. Specifically, the following questions were addressed: When the effects of teacher perceptions of student behavior are controlled, what is the relationship of teacher behavior to teacher perceptions of ability? and, When the effects of teacher perceptions of student ability are controlled, what is the relationship of teacher behavior to teacher perceptions of student behavior? Results will be examined in light of current research on differential teacher behavior.

Methodology

Overview

Data for this investigation came from the Texas Junior High School Study, a large multi-faceted study designed to identify variables that were related to affective and cognitive student outcomes in seventh and eighth grade mathematics and English classes. During the 1974 school year, 58 mathematics and 78 English classes were visited alternately by two observers approximately 20 times. In each class 10 to 12 students were chosen randomly within sex for intensive observation, and these

students' interactions with the teachers were recorded on a low inference observational coding system.

At the end of the school year, teachers were asked to complete five-point rating scales on each of their students. These rating scales covered five dimensions: academic performance, behavior, motivation, turning in homework on time, and would want to teach again. Other data were also collected but will not be discussed here. The methodology and results of the larger study are described more completely in Evertson, Anderson, Anderson, and Brophy (1978).

Subjects

A total of 68 teachers were observed in nine junior high schools that represented a wide-range of socioeconomic status levels in a large urban school district. Because two sections were observed for each teacher, there were 136 classrooms in all, 58 math and 78 English. Teachers selected for the study had at least 1 year of previous experience teaching in their subject matter area. As noted previously, only 10 to 12 students from each class were randomly chosen for intensive observation.

The data set for the analyses presented in this paper is smaller than the original data set. The reduction of data was necessary to eliminate students with missing data and yet maintain a minimum of six students per class. Therefore, the final data set for this study consisted of 50 mathematics classes and 55 English classes. Data were available for 397 students in math classes and 456 students in English classes, with an average of eight students per class.

Data Collection

Two observers were trained to use the observational coding system. The observers were trained to a reliability criterion of 80 percent agreement on each major section of the coding system. After this time, observers worked alone. Observers alternated visits to classrooms so that each class was observed approximately 20 times throughout the school year.

Description of Variables

The five teacher ratings of students (academic performance, behavior, motivation, turning in homework on time, and would want to teach again) were factor analyzed using principal components analysis with varimax rotation. Two factors resulted: general teacher perceptions of student academic ability (composed of motivation, academic performance, and turns in homework on time) and teacher perceptions of student behavior (composed of behavior and would want to teach again). Factor loadings are shown in Table 1. Composite scale scores were created for each of the two factors by summing scores of the appropriate items. These two composite scores were used to indicate teacher perceptions of student ability and of behavior.

Two types of behavior variables were created to measure teacher's treatment of students: rates and proportions. To obtain rate variables, the frequency of occurrence of a variable was summed across the whole year and then divided by the number of 50 minute periods for which the class was observed, thus, giving an index of the rate certain variables occurred per observation.

Proportion variables were created by summing frequencies of single categories (e.g., the number of correct answers) across all observations. Then these frequencies were used to create proportions

representing actual occurrences compared to maximum possible occurrences (e.g., the proportion of all answers that were correct answers). Rate and proportion variables are listed in Tables 2 and 3.

Data Analyses

Class means were first subtracted from student scores on both the teacher behavior variables and the two composite scores measuring perceptions of student ability and behavior. This technique removed dependence among student scores due to class mean differences. That is, some teachers may have rated all their students more highly than other teachers, or they may have used a particular behavior such as criticism more than another teacher simply because of differences in teaching style and/or personality. These differences in class means may obscure relationships at the individual level. One way to deal with this problem is to subtract class means from students' scores and in essence analyze student level data within classes (Cronbach, 1976). This is the approach chosen for this investigation.

Once class means were subtracted from students' scores, three sets of correlations were run between the teacher behaviors and the two composite teacher ratings of student behavior and ability. The first set of correlations involved simple Pearson correlations. The second and third sets of correlations involved partial correlations; partial correlations were necessary because the composite scale scores for ability and behavior were correlated. In the first set of partial correlations, teacher behaviors were correlated with perceived student ability partialing out or holding constant perceived student behavior. The third set of correlations consisted of partial correlations between teacher behaviors and perceived student behavior controlling for

perceived ability. The degrees of freedom used to determine the significance of these correlations was adjusted for the number of classes, i.e., the number of classes was subtracted from the total number of degrees of freedom available for both Pearson and partial correlations. This was necessary because student scores on all variables were deviated from class means.

Results

Correlations between teacher behaviors and composite ratings of student behavior and student ability are shown in Table 2 for math and in Table 3 for English. These tables include both simple Pearson correlations and partial correlations. Both Pearson and partial correlations between teacher behavior and student behavior and between teacher behavior and student ability are generally small. There are several limitations on these data that might be expected to attenuate relationships between teacher behaviors and teacher perceptions of both ability and desirable student behavior. First, teacher ratings of students were conducted only at the end of the year, whereas teacher behavior data were collected over the entire year. It is likely that teacher perceptions of both ability and behavior changed somewhat over the course of the year; thus, end of year ratings may not provide an accurate assessment of teacher attitudes during the year when data were collected on teacher behaviors. The second limitation concerns restriction of within-class variance on student level variables; a number of the English and math classes included in this study were tracked. Consequently, teachers may not have exhibited as much differential behavior toward students as would have been expected in more heterogeneous classes.

Comparison of Pearson and Partial Correlations

Ratings of student ability and ratings of student behavior correlated .41, indicating that approximately 17 percent of the variance in these two sets of ratings was shared. Accordingly, significant Pearson correlations between teacher ratings of student ability and teacher behaviors may be due, not to differences in student ability, but rather to differences in student behavior. That is, higher ability junior high students tend to be more cooperative than lower ability students, and teachers may treat these higher ability students differently because of their different behavior, not because of their higher ability.

Results for this study demonstrate that simple Pearson correlations between teacher behavior and teacher ratings of student ability can be misleading. For example, in math there was a significant negative Pearson correlation between private teacher-initiated academic contacts and ratings of student ability suggesting that teachers contacted students they perceived as lower ability more often for academic matters than students they perceived as higher ability. However, when perception of student behavior was partialed out, this correlation was no longer significant. This suggests that teachers may have been contacting students perceived as lower ability more frequently in an effort to gain their cooperation, rather than because of their lower ability. In other words, teachers may have attempted to contact less cooperative students more frequently for academic matters to try to keep tabs on these students and keep them involved in their studies so they would be less likely to cause disruptions.

The data also revealed situations where there were nonsignificant Pearson correlations between teacher behaviors and teacher ratings of student ability, but significant partial correlations between the two when ratings of behavior were controlled. This result might be expected if the teacher behavior was positively related to ratings of student ability and negatively related to ratings of student behavior (or vice versa). In this situation, when correlating teacher behaviors with a measure of student ability which also contains variance related to student behavior (as in the Pearson correlations), the positive relationship between teacher behavior and student ability might be masked by the negative relationship between teacher behavior and student behavior. For example, results from this study indicated that math teachers provided less process feedback (a step by step review of the process used to derive the correct answer) to the incorrect answers of students perceived as higher ability and more process feedback to the incorrect answers of students perceived as better behaved. However, these relationships were not significant when simple Pearson correlations were obtained between process feedback and ratings of student ability and student behavior.

In summary, these results demonstrate that partial correlations provide a more appropriate method than simple Pearson correlations for investigating the question of whether differential teacher behavior is related to student characteristics when these student characteristics are also related.

Teacher Behavior and Teacher Perceptions of Student Ability

Correlations between teacher behavior and teacher perceptions of student ability partialing out teacher perceptions of student behavior

are shown in Table 2 for math and Table 3 for English. Results for math classes will be discussed first, followed by results for English classes.

In math classes when teacher perceptions of student behavior were controlled, students perceived as lower ability were less likely to be called on as volunteers or to call out answers out of turn. These results suggest that such students tended not to initiate participation in whole class settings. Consequently, it is not surprising to find that students perceived as lower ability had, overall, fewer response opportunities in whole class settings. Perhaps in an attempt to counteract this trend, teachers called on students they perceived as lower ability more often as nonvolunteers. Furthermore, when these students did respond in public settings, teachers were more likely to praise their correct answers. Teachers provided more process feedback to the incorrect answers of students perceived as lower ability, and there was a trend in the data suggesting that teachers also provided more sustaining feedback to the incorrect answers of these students.

In summary, results for math classes formed a pattern suggesting that students perceived as lower ability were less likely to initiate public interactions with the teacher. However, teachers responded to this lack of initiation by calling on these students more as nonvolunteers and by providing encouragement to these students when they did respond to teacher questions.

In English classes when teacher perceptions of student behavior were controlled, students perceived as lower ability were less likely to be chosen as volunteers or to call out answers out of turn than students perceived as higher ability. As in math classes, this result suggests

that lower ability students initiated participation in whole class settings less often than higher ability students. Accordingly, the finding of fewer response opportunities overall for students perceived as lower ability was not surprising. English teachers, in contrast to math teachers, did not try to compensate for the fewer response opportunites of lower ability students by calling on these students more as nonvolunteers. Rather, these students received a higher proportion of public response opportunities through patterned turns, a method of selection in which students were called on in some pattern such as the teacher moving methodically down the rows calling on every student in turn. Results do indicate, however, that English teachers initiated more private academic interactions with students they perceived as lower ability. English teachers were also more likely to provide sustaining feedback to "don't know" and no response answers of students perceived as lower ability, but teachers were less likely to provide process feedback to the incorrect answers of these students.

To summarize, in English classes as in math classes, results suggest that students perceived as lower ability were less likely to initiate public interactions with the teacher. English teachers responded to decreased public interactions, however, by seeking out such students more for private interactions on academic matters rather than calling on them more as nonvolunteers. When these students did respond in whole class settings, there is some indication that teachers tried to provide greater encouragement for them than for students perceived as higher ability, but this trend is not as clear in English as it is in math.

Teacher Behavior and Teacher Perceptions of Student Behavior

Correlations between teacher behaviors and teacher perceptions of student behavior partialing out teacher perceptions of student ability are shown in Tables 2 and 3. Results will be presented first for math classes and then for English classes.

In math classes students perceived by teachers as presenting more behavior problems had higher rates of public response opportunities and more teacher initiated procedural and private academic contacts than students perceived as better behaved. There was also a trend in the data suggesting teachers contacted behavior problem students more often for social interactions as well. Students perceived as more poorly behaved were less likely to be selected as nonvolunteers to respond to teacher questions and more likely to call out answers out of turn. These students also received less process feedback to incorrect answers than better behaved students.

In English classes students perceived as presenting more behavior problems had a higher rate of public response opportunities and were contacted more frequently by the teacher for social and procedural matters. These students were also more likely to call out answers out of turn. In contrast to math, however, students perceived as more poorly behaved were more likely to receive process feedback to incorrect answers than students who were perceived as better behaved.

To summarize, results for both English and math indicate that teachers interacted more with students perceived as presenting behavior problems. The greater number of public response opportunities may be attributed, at least in part, to the tendency of these problem students to create such opportunities through frequent callouts. In private settings, however, teachers sought out these behavior problem students

more often than other students, perhaps in an attempt to keep tabs on them and keep them engaged in appropriate activities. The only feedback behavior that was related to student behavior was process feedback; results suggested that math teachers were less likely and English teachers more likely to give process feedback to the incorrect answers of students perceived as behavior problems.

Discussion

Cooper (1979) suggested in his model of differential teacher behavior that teachers may perceive their own control as a more important determinant of success for lower ability students, and thus teachers may try to discourage these students from participating in whole class public interactions where the teacher has less control. Rather, the teacher may seek out these students more often for private interactions where the teacher can provide a structure that increases the student's chances of success.

Results for math classes did not support this theory of differential teacher behavior; results suggested that teachers tried to draw students they perceived as lower ability into whole class activities and provided greater encouragement to these students when they did respond in whole class situations. Furthermore, there was no indication that teachers sought out these students more for private interactions than students perceived as higher ability. In English classes, however, results were more consistent with the model. Results suggested that English teachers did not make a special effort to include students perceived as lower ability in whole class activities. English teachers did, however, seek out these students more often for private academic contacts. When students perceived as lower ability did respond

during whole class activities, teachers did not seem to provide as much encouragement for these students as math teachers did.

The reasons for the different relationships in English and math classes may lie in the different nature of activities in the two types of classes. Math teachers may have been more willing to deal with lower ability students in whole class settings than English teachers because math interactions are generally more structured than English, i.e., math teachers may have felt that they had greater control over interactions than English teachers and, therefore, may have been more willing to bring lower ability students into whole class activities. Similarly, the way teachers reacted to students when they did participate in whole class activities may have been affected by subject matter differences. This is most clearly suggested by the variable, process feedback to incorrect answers. The contrasting results for this variable for English and math classes may be due to the different type of questions asked in the two subjects. In math, when a student is unable to work a problem correctly, the teacher may be able to quickly explain the process used to derive the answer or point out where the student went wrong without taking up too much class time. In English, however, many questions may not lend themselves as easily to process feedback. Questions may be either simple, short answer questions such as naming the main character of a story, or open-ended questions with a variety of acceptable answers such as explaining why a character took some particular action. With regard to the short, simple questions, answering may involve simple recall; in this case, process feedback would be pointless. In the case of the open-ended questions, it may not be possible for the teacher to take the amount of time necessary to

explain to lower ability students during whole class activities the reasoning process necessary to derive an acceptable answer.

Results for the relationship of teacher behavior to perceptions of student behavior suggest that in both English and math classes, teachers were interacting more with students they perceived as more poorly behaved. As indicated previously, this may be an attempt by the teachers to continually monitor these students' behavior and keep them engaged in appropriate activities. The contradictory results for process feedback may be due, again, to the different nature of activities in math and English. More research needs to be done in different subject areas on differential teacher behavior toward students perceived as being better behaved and more poorly behaved in the classroom.

In conclusion, results from this study have implications for researchers investigating differential teacher behavior within the classroom. Traditionally, differential teacher behavior has been considered to be largely a result of teacher perceptions of student ability. However, teacher perceptions of student behavior also appear to have an effect upon teacher behavior in the classroom. Consequently, both characteristics must be considered when attempting to understand differences in teacher behavior toward different students. Undoubtedly, other student characteristics also affect teacher behavior, and these characteristics need to be investigated as well before an attempt is made to attribute differences in teacher behavior to particular student characteristics. Futhermore, because these student characteristics are rarely independent, it is advisable when investigating their relationship to teacher behaviors, to use partial correlations or some

other method that will allow the effects of the various student characteristics to be separated. Finally, this study demonstrates the importance of considering the context in which teacher-student interactions occur, i.e., the dynamics of the interactions may be different for different activities and/or different subjects.

Reference Notes

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Table 1

Principle Components Analysis of Teacher

Ratings of Students with Varimax Rotation

	Loadings	
Ratings	Factor 1	Factor 2
Motivation	.89	.34
Would want to teach again	.39	.81
Academic performance	.88	.36
Turns in homework on time	.81	.44
Behavior in class	.33	.86

Table 2

Math Classes

Teacher Behaviors	Pearson Correlations		Partial Correlations	
	Behavior	Ability	Behavior Partialing Out Ability	Ability Partialing Out Behavior
Proportions				
Response opportunities given to students preselected in patterned turns	.10	.03	.10	-.05
Response opportunities given to students preselected in nonpatterned turns	.03	-.01	.06	-.05
Response opportunities given to non-volunteers	.01	-.13*	.15*	-.21*
Response opportunities given to volunteers	-.00	.10	-.10	.15*
Response opportunities answered by callouts	-.06	.05	-.13*	.13*
Correct answers which teacher praised	-.02	-.09	.07	-.12*
Correct answers after which teacher asked new question	-.05	-.07	-.00	-.05
Correct answers after which teacher gave no feedback	.06	.05	.03	.02

Table 2, continued

Teacher Behaviors	Pearson Correlations		Partial Correlations	
	Behavior	Ability	Behavior Partialing Out Ability	Ability Partialing Out Behavior
Proportions				
Correct answers after which teacher gave process feedback	-.04	.03	-.09	.09
Incorrect answers after which teacher gave process feedback	.10	-.01	.15*	-.11*
Don't know/no response after which teacher gave process feedback	-.07	-.07	-.02	-.03
Incorrect answers which teacher criticized	.02	.02	.00	.01
Don't know/no response answers which teacher criticized	-.03	-.01	-.03	.01
Incorrect answers after which teacher gave sustaining feedback	-.04	-.06	-.00	-.04
Don't know/no response answers after which teacher gave sustaining feedback	-.05	-.13	.06	-.13

Table 2, continued

Teacher Behaviors	Pearson Correlations		Partial Correlations	
	Behavior	Ability	Behavior Partialing Out Ability	Ability Partialing Out Behavior
Rates				
Public response opportunities	.01	.13*	-.11*	.17*
Teacher initiated private academic contents	-.26*	-.22*	-.15*	-.05
Teacher initiated contacts related to classroom procedures	-.26*	-.16*	-.20*	.02
Teacher initiated contacts which were social	-.01	.09	-.10	.14*

*$p \leq .05$

Table 3

English Classes

Teacher Behaviors	Pearson Correlations		Partial Correlations	
	Behavior	Ability	Behavior Partialing Out Ability	Ability Partialing Out Behavior
Proportions				
Response opportunities given to students preselected in patterned turns	.09	-.07	.22*	-.21*
Response opportunities given to students preselected in nonpatterned turns	.08	.02	.10	-.07
Response opportunities given to non-volunteers	-.02	-.04	.02	-.05
Response opportunities given to volunteers	.07	.14*	-.05	.13*
Response opportunities answered by callouts	-.18*	-.06	-.19*	.11*
Correct answers which teacher praised	.06	.02	.06	-.03
Correct answers after which teacher asked new question	.03	.02	.02	.00
Correct answers after which teacher gave no feedback	-.02	-.04	.02	-.04

Table 3, continued

Teacher Behaviors	Pearson Correlations		Partial Correlations	
	Behavior	Ability	Behavior Partialing Out Ability	Ability Partialing Out Behavior
Proportions				
Correct answers after which teacher gave process feedback	.08	.09	.03	.04
Incorrect answers after which teacher gave process feedback	-.04	.15*	-.24*	.28*
Don't know/no response answers after which teacher gave process feedback	-.08	-.05	-.06	.01
Incorrect answers which teacher criticized	-.02	.00	-.04	.03
Don't know/no response answers which teacher criticized	.01	-.05	.08	-.09
Incorrect answers after which teacher gave sustaining feedback	.02	.06	-.04	.07
Don't know/no response after which teacher gave sustaining feedback	.01	-.12	.16	-.21*

Table 3, continued

Teacher Behaviors	Pearson Correlations		Partial Correlations	
	Behavior	Ability	Behavior Partialing Out Ability	Ability Partialing Out Behavior
Rates				
Public response opportunities	.00	.16*	-.19*	.24*
Teacher initiated private academic contacts	-.21*	-.25*	-.04	-.13*
Teacher initiated contacts related to classroom procedures	-.18*	-.07	-.19*	.10
Teacher initiated contacts which were social	-.04	.06	-.12	.13

*$p \leq .05$